

WHAT IS CLAIMED IS:

1. An optical communication system for performing Wavelength Division Multiplexing (WDM) optical communication, comprising:

5 (a) an optical reception device comprising:

Bit Error Rate (BER) measurement means for measuring BERs of individual optical signals with different wavelengths that are received from a sending end, and

10 BER transmission means for transmitting BER information back to the sending end; and

(b) an optical transmission device disposed at the sending end, comprising:

wavelength assignment means for assigning each  
15 wavelength for optical signals to at least one of high Quality-of-Service (QoS) communication and low QoS communication,

wavelength-assignment exchanging means for identifying, based on the BER information, that low  
20 quality wavelengths with high BERs are being used for the high QoS communication, and unless the low quality wavelengths being used for the high QoS communication outnumber high quality wavelengths with low BERs being used for the low QoS communication, exchanging the low  
25 quality wavelengths and an equal number of the high quality wavelengths, and

optical signal transmission means for multiplexing

the wavelengths to transmit the optical signals.

2. The optical communication system according to claim 1, wherein said wavelength assignment means uses the high QoS communication for a bandwidth-guaranteed connection service and uses the low QoS communication for a best-effort connection service.

3. The optical communication system according to claim 1, further comprising optical power control means for amplifying optical power of the low quality wavelengths or all wavelengths in a case where wavelengths cannot be exchanged to assign more appropriate wavelengths or where BERs are desired to satisfy a prescribed level.

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4. The optical communication system according to claim 3, wherein said optical power control means is provided as a field installable option.

5. The optical communication system according to claim 1, wherein wavelength assignment by said wavelength assignment means and exchange of wavelengths by said wavelength-assignment exchanging means are controlled from a maintenance terminal.

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6. An optical reception device for receiving Wavelength Division Multiplexing (WDM) optical signals,

comprising:

Bit Error Rate (BER) measurement means for measuring BERs of individual optical signals with different wavelengths that are received from a sending end; and

BER transmission means for transmitting BER information back to the sending end.

7. An optical transmission device for transmitting Wavelength Division Multiplexing (WDM) optical signals, comprising:

wavelength assignment means for assigning each wavelength for optical signals to at least one of high Quality-of-Service (QoS) communication and low QoS communication;

wavelength-assignment exchanging means for identifying, based on Bit Error Rate (BER) information, that low quality wavelengths with high BERs are being used for the high QoS communication, and unless the low quality wavelengths being used for the high QoS communication outnumber high quality wavelengths with low BERs being used for the low QoS communication, exchanging the low quality wavelengths and an equal number of the high quality wavelengths; and

optical signal transmission means for multiplexing the wavelengths to transmit optical signals.

8. The optical transmission device according to claim  
7, wherein said wavelength assignment means uses the high  
QoS communication for a bandwidth-guaranteed connection  
service and uses the low QoS communication for a best-  
5 effort connection service.

9. The optical transmission device according to claim  
7, further comprising optical power control means for  
amplifying optical power of the low quality wavelengths or  
10 all wavelengths in a case where wavelengths cannot be  
exchanged or where BERs are desired to satisfy a  
prescribed level.

10. The optical transmission device according to claim  
15 9, wherein said optical power control means is provided as  
a field-installable option.

11. The optical transmission device according to claim  
7, wherein wavelength assignment by the wavelength  
20 assignment means and exchange of wavelengths by the  
wavelength-assignment exchanging means are controlled from  
a maintenance terminal.